

RFA

CPS CHEMICAL COMPANY, INC.
OLD WATERWORKS ROAD
OLD BRIDGE, MIDDLESEX COUNTY, NEW JERSEY
EPA ID# NJD002141190

CPS manufactures specialty organic chemicals including various monomers and polymers which are used in a variety of water treatment applications. These compounds include flocculants, dispersants, and coagulants which are used to treat potable water, sewage plant waters, and a variety of industrial waters in the mining, pulp and paper, and petroleum industries. A smaller portion of their operation consists of toll processing, which involves the recovery of certain solvents and other organic chemicals by distillation. Approximately 110 people are employed at the facility, which began operations in 1968. It is a 24 hour per day, 7 day per week operation. CPS Chemical is a public company, however the management is considering changing the company to private ownership. The site consisted of an undeveloped wooded area prior to being occupied by CPS. The facility property covers about 40 acres, which includes 30 acres of undeveloped land to the east of the active operating plant area. The immediate area bordering the facility includes both industrial and undeveloped wetland areas. Communities within 2-3 miles in the region surrounding the facility along with recent population figures shown in parenthesis, include Old Bridge Township (51,000), Sayreville Boro (32,300), and South River Boro (14,300).

CPS shares a common border with Madison Industries, which is located adjacent to the western boundary of the CPS facility. Madison Industries is involved in the production of inorganic chemicals, primarily zinc salts which are used in fertilizers, pharmaceuticals, and food additives. The City of Perth Amboy owns a 1200 acre tract of land known as the Runyon Watershed directly to the west of the 2 facilities where a number of public supply wells tap the underlying Old Bridge Sand aquifer. There is no present recreational use of the watershed permitted, however the area is accessible by foot and thus could potentially be used as a recreational area by local youths since there are residential homes nearby.

Several interconnected surface waters are present within the Runyon Watershed. Prickett's Brook originates in a broad swampy area to the east of the CPS facility and flows through both the CPS and Madison Industries properties before discharging into Prickett's Pond approximately 1000 feet west of CPS. Prickett's Brook continues west and empties into the northern end of Tennent Pond. From this point, the flow is in a northwest direction via Tennent Brook, which flows to the South River. Prickett's Brook once flowed through the center of the CPS plant and was relocated around the perimeter of the plant in the early 1970's. A series of 9 culverts were once used to drain storm runoff from the CPS facility into Prickett's Brook, which were removed in 1979.

The active operating portion of the CPS facility is underlain by a soil-cement/asphalt containment base which was installed in 1979 in accord with NJDEP-approved plans, and includes a berm around the entire plant. Beneath the facility is the Raritan Formation (200-250 feet thick), which consists of alternating beds of clay, sand and gravel in descending order as follows:



- Old Bridge Sand
- South Amboy Fire Clay
- Sayreville Sand
- Woodbridge Clay
- Farrington Sand

The Old Bridge Sand extends to an average depth of 75-80 feet and is the principal aquifer unit in the area. The average depth to ground water is 4-5 feet and the overall direction of flow is to the southwest, toward Prickett's Pond. Recent soil boring data indicates that the South Amboy Fire Clay is not continuous in the vicinity of the CPS facility, so that locally there may be no separation between the Old Bridge Sand and Sayreville Sand. It has not been determined if the Sayreville Sand substantially exists in this area. No information could be found regarding any hydraulic connection between the Old Bridge Sand and Farrington Sand, however the potential for downward migration of contaminants into the Farrington Sand is low due to the Woodbridge Clay, which is 50-90 feet thick and overlies the Farrington Sand. Salt water intrusion is threatening the Farrington Sand aquifer in this area. The Old Bridge Sand represents the principal ground water migration pathway at the CPS site.

A 1981 court decision found CPS Chemical and Madison Industries responsible for pollution of the Runyon well field owned by the City of Perth Amboy, where 32 suction wells and 3 pump wells along Prickett's Pond and Brook were shut down in 1973 due to contamination with organic chemicals and heavy metals. The court determined that CPS was the source of the organic chemical contamination and Madison Industries was the source of the heavy metal contamination. Surface water contamination of Prickett's Brook and Prickett's Pond and ground water contamination of the underlying Old Bridge Sand aquifer was determined to be the result of spills, leaks, and runoff from the 2 companies. The CPS/Madison site is ranked tenth on the National Priorities List, fourth among sites in New Jersey. Currently, the City of Perth Amboy draws the majority of its potable water from several wells which tap the Old Bridge Sand near the southern end of Tennent Pond. Other public supply wells near the CPS facility include the Sayreville Boro Water Department located approximately $\frac{1}{2}$ mile northwest ~~west~~ of the facility, where a number of wells also tap the Old Bridge Sand. Available hydrogeological data indicates that the direction of ground water flow in relation to the CPS facility is toward the southwest, and not in the direction of Sayreville's wells.

NJPDES PERMIT

The facility discharges 95,000 gallons per day of process wastewater, stormwater runoff, and boiler blowdown to Middlesex County Utilities Authority (MCUA). Process wastewater is pretreated by neutralization and phase separation prior to being discharged to the Old Bridge Township sewer system, which leads to MCUA. Tank 310 (11,000-gallon tank) is used for pH adjustment and separation of insoluble organic material; the unit was recently determined to be an Industrial Waste Management Facility (IWMF). The wastewater may contain organic compounds and metals such as copper, lead, zinc, allyl alcohol, 1,2-dichlorobenzene, methylene chloride, and phenol. The facility submitted a NJPDES-SIU permit application (NJPDES # NJ0098931) in 1982, which is under review by NJDEP/DWR/Bureau of Industrial Waste Management.

AIR PERMITS

CPS has 52 air permits, which include mostly storage tanks, along with reactor vessels and a boiler system. The facility has had problems with fugitive emissions in recent years, mostly involving releases of acrylate odors due to scrubber problems at the acrylate and methyl acrylate process areas. Several Administrative Orders were issued over the period 1984-1986 for releases of acrylate, methyl acrylate, and fatty acid odors. The facility recently purchased a new scrubber system for the acrylate and methyl acrylate process areas, which should help correct fugitive emission problems at the facility.

RCRA PART B PERMIT APPLICATION

CPS submitted a RCRA Part B application 7/15/85 which is currently undergoing technical review. An NOD was issued 11/16/86 and the response was received 1/12/87 which is currently under review by NJDEP/DHWM/Bureau of Hazardous Waste Engineering. The primary waste stream at the facility consists of distillation heels or still bottoms which contain organic solvents such as acetone, methanol, toluene, and a mixture of esters. The facility also carries out a waste fuel blending operation on-site where distillation heels, triethylene glycol (TEG) residues, allyl glycidyl ether (AGE) residues, and residues from toll processing are blended and shipped off-site to SRS Newark. The facility is considered a commercial hazardous waste facility due to their toll processing operation, in which waste solvent streams are received from customers for purification and resale to the same customer as a raw material. Facilities which currently send wastes to CPS for toll processing include the following:

1. Biocraft Industries - methylene chloride
2. Miranol Corporation - aminoethyl ethanolamine (AEEA)
3. Polaroid Corporation - dimethyl sulfoxide (DMSO)
4. DuPont Corporation - triethylene glycol (TEG)

The above waste materials from Polaroid and DuPont are no longer considered hazardous under RCRA. Previous shipments of dimethyl sulfoxide from Burroughs Wellcome and morpholine from ICI Americas are no longer received.

SOLID WASTE MANAGEMENT UNITS

A total of 13 solid waste management units were identified at the facility and include 2 drum storage areas, 5 tank storage areas, 5 tank truck/drum cleaning areas, and 1 railroad transfer area. RCRA-regulated units include 1 drum storage area, and 12 individual storage tanks which are located within several of the tank storage areas.

The RCRA-regulated drum storage area (200' x 50') is an open space with potential capability to store thousands of drums. The original RCRA Part B application indicated a capacity of 50,000 gallons or 1000 drums, however the capacity has been reduced in the revised Part B to 10,000 gallons (200 drums). Wastes stored in this area include distillation heel residues, lead bag residues, sump slops, and lab packs. The distillation heel residues are composed mostly of methacrylate ester heels. The lead bag residues consist of letharge (lead oxide) residues; letharge is a raw material for manufacturing

processes at CPS. The sump slops consist of sand and sediment from sumps which may contain organic residues such as esters. An inspection conducted by NJDEP/DHWM/Central Bureau Regional Enforcement 1/18/85 reported over 1200 drums in storage, mostly containing methacrylate ester heels. Since that time, the number has been greatly reduced and there are currently less than 50 drums in storage. Prior to 1979, drums were stored in this area on partially unpaved ground with no diking. A 1977 aerial photograph revealed large areas of unpaved ground adjacent to the drum storage area where any spills or contaminated runoff may have impacted the soil and ground water, as well as nearby Prickett's Brook. The potential for releases to the environment from this unit is currently low because the unit is paved and located within the bermed area which surrounds the entire facility. However, there is a potential for soil contamination from past operations in the vicinity of the unit. Soil sampling should be conducted to determine if the soil beneath the pad is contaminated.

The raw material drum storage area is also an open area approximately 200' x 150' in size. The unit is paved and located within the bermed process area, thus representing a low potential for release to soil and ground water. Materials stored in this area include acetone, allyl glycidyl ether, ammonia, methacrylic acid, nitric acid, sodium hydroxide, and various alcohols. Currently, there are about 400-500 drums stored in this area. There have been no documented releases to the environment associated with the unit. A 1977 aerial photograph revealed areas unpaved ground adjacent to the unit where any spills or contaminated runoff may have impacted the soil and ground water. Soil sampling should be conducted to determine if soil in the vicinity of the unit is contaminated.

The 5 tank storage areas include 4 tank farms and 1 process pad which are used for the storage of crude raw materials and hazardous wastes, along with a smaller amount of finished product. The process pad also includes several reaction tanks which are used for processing of acrylate and methyl acrylate. The tank storage areas are identified as follows:

Tank Farm 1 and 2 - Tank Farms 1 and 2 were identified as one unit because they are located within the same diked area. Tank Farm 1 consists of 12 tanks with combined capacity of 147,000 gallons. Three of the tanks are RCRA-regulated with combined capacity of 30,000 gallons. Tank Farm 2 consists of 15 tanks with combined capacity of 94,000 gallons, 3 of which are RCRA-regulated with combined capacity of 15,000 gallons.

Tank Farm 3 - Consists of 6 tanks with combined capacity of 120,000 gallons, none of which are RCRA-regulated.

Tank Farm 4 - Consists of 10 tanks with combined capacity of 160,000 gallons. Three of the tanks were RCRA-regulated, but were recently decontaminated and are no longer being used for hazardous waste storage.

Tank Farm 5 - Consists of 4 tanks with combined capacity of 135,000 gallons, 1 of which is RCRA-regulated with capacity of 35,000 gallons.

Process Pad - Consists of 12 tanks with combined capacity of over 75,000 gallons. The tanks in this area include 2 RCRA-regulated tanks with combined capacity of 25,000 gallons, 1 wastewater treatment tank (11,000 gallons), and several reaction tanks.

Raw materials which may be stored in the above tank farm areas include mixed alcohols, water-based polymers, and glycols. Other materials which are stored in tanks at the facility according to the NJDEP Right to Know survey include methyl methacrylate, methylene chloride, and toluene.

Hazardous wastes are stored in 12 RCRA regulated storage tanks which are identified as follows:

<u>TANK</u>	<u>CAPACITY (gallons)</u>	<u>CONTENTS</u>	<u>LOCATION</u>
4,5,6	20,000 each	crude dimethyl sulfoxide	Tank Farm 4
13,14	10,000 each	crude aminoethyl ethanolamine	Tank Farm 1
16,18	10,000 each	waste fuel (mixed monomer heels)	Tank Farm 1,2
30,32	5,000 each	waste fuel (glycidyl ether heels)	Tank Farm 2
39	35,000	methylene chloride, alcohols, acetone	Tank Farm 5
311	7,583	waste fuel (mixed monomer heels)	Process Pad
R-3	20,000	mixed solvents	Process Pad

Tanks 4,5,6 and 18 were recently decontaminated and are no longer being used to store hazardous wastes. According to facility representatives, the tank farm and process pad areas were paved and diked in the early 1970's. Inspections by NJDEP in 1975 and 1976 indicated that the flooring within the tank farm areas was incomplete and staining of the ground surface was observed within some of the diked areas. All of the tank storage areas have drains which lead to sumps where material is either recovered or pumped to the wastewater treatment unit. The file review revealed no documented releases to the environment associated with any of the tank storage areas, however the potential for soil and ground water contamination exists in the vicinity of the units due to any spills or contaminated runoff which may have occurred prior to the completion of secondary containment. During the site inspection conducted 5/8/87 by NJDEP/DHWM/Bureau of Planning and Assessment, the flooring within the 5 tank storage areas appeared to be in good condition, with the exception of the process pad area which appeared to be in very poor condition. Soil sampling should be conducted to determine if the underlying soil in the vicinity of these units is contaminated. In addition, the flooring within the process pad area should be upgraded to prevent any potential releases to the soil and ground water.

The 5 tank truck/drum cleaning areas consist of reinforced concrete surfaces sloped to concrete trench drains which flow to sumps. The sump water is analyzed and either sent to Tank 310 for treatment or discharged directly to the sewer. These units are used by CPS to clean out their own tank trucks contain various water treatment compounds by means of a methanol/water solution. There are no records of any releases to the environment associated with these units. The potential for release to the environment from these units is currently low due to unit design. No sampling is recommended for these units.

The railroad transfer area is located along the western boundary of the facility next to Madison Industries. Materials which are handled in this area include crude raw materials, primarily glycols, which are either pumped to storage tanks or directly to the processing units. On average, 3-4 rail cars may be stored in this area with combined capacity of 40,000-60,000 gallons. The active railroad unloading area has concrete containment which drains to a sump. An inactive portion of the railroad siding extends to the back of the property and runs parallel to Prickett's Brook. Evidence of spillages at the railroad siding along Prickett's Brook were observed during inspections conducted by NJDEP in 1975 and 1976, representing a potential for soil contamination. In 1976, a spill of approximately 3000 gallons of triethylene glycol occurred from a broken railroad tank car valve. A NJDEP investigation indicated that most of the spilled material leached into the ground along the railroad siding. The potential for soil and ground water contamination exists as a result of the release and from past operations in this area. Soil sampling is recommended to determine if soil in the vicinity of the railroad siding is contaminated.

According to facility representatives, there has never been any storage of materials in underground tanks at the facility. Fuel oil is stored in 3 above-ground tanks with combined capacity of 50,000 gallons, and gasoline is stored in one 4,000-gallon above-ground tank.

PREVIOUS INVESTIGATIONS

Numerous studies have been conducted to investigate the surface water and ground water pollution of the Runyon Watershed by NJDEP and several outside consultants including Adteck, Woodward-Clyde, Dames and Moore, Converse Consultants, and Wehran Engineering. Studies done by NJDEP, Dames and Moore, and Wehran Engineering have involved investigations related to the off-site migration of contaminants from CPS facility via surface water and ground water routes.

NJDEP conducted sediment sampling of Prickett's Brook in 1981 which included 15 sediment samples taken along the stream bed downstream from the CPS facility. The results indicated the presence of volatile organics such as benzene, chlorobenzene, 1,2-dichloroethylene, tetrachloroethylene, and toluene.

An investigation of sediment contamination in Prickett's Pond was carried out jointly by Wehran Engineering, consultant for CPS chemical, and Converse Consultants, representing Madison Industries. A report submitted by Wehran Engineering in 1984 included an evaluation of sediment contamination with respect to volatile organic priority pollutants; 89 samples of the pond sediment were analyzed up to a depth of 5 feet. Volatile organic contamination was detected throughout the pond, however the majority of contamination was determined to be confined to the upper 6-12" of sediment in the eastern end of the pond. The results indicated total volatile organic contamination up to 2737 ppb, the predominant contaminant being methylene chloride (up to 2348 ppb). Migration of contaminated ground water into the pond from the underlying Old Bridge Sand was determined to be the principal mechanism accounting for the volatile organic contamination detected in the sediments.

A study conducted by Dames and Moore in 1980 included an investigation of ground water contamination in the vicinity of the CPS/Madison site. A volatile organic plume was identified in the ground water extending from the CPS property beneath Madison Industries property toward Prickett's Pond. Volatile organics detected in the ground water included methylene chloride (up to 103,000 ppb), 1,1,2,2-tetrachloroethylene (up to 8400 ppb), trichloroethylene (up to 4400 ppb), toluene (up to 3400 ppb), and xylene (up to 4200 ppb).

Wehran Engineering submitted a report in 1983 which included a summary of ground water contamination and recommendations for ground water remediation. The highest concentrations of volatile organics were detected in the ground water beneath the CPS facility near the western boundary at well WCC-6S (up to 15,490 ppb), and several downgradient wells located between the facility and Prickett's Pond. The only significant contamination by metals detected in the ground water beneath the CPS facility was lead (up to 206 ppb). Soil samples below the water table were taken from 5 borings at the CPS facility; the only significant contamination detected was at boring B-2, located between the tank storage areas and Prickett's Brook, which exhibited low levels of contamination with benzene, methylene chloride, and 1,1 2,2-tetrachloroethylene.

Currently, there are about 50 monitoring wells (14-99 feet deep) in the vicinity of the CPS/Madison site, which includes 17 on the CPS facility property and most of the remainder in the downgradient area between Madison Industries and Prickett's Pond. The most recent sampling conducted was in March 1987 by Wehran Engineering; results indicate that the heaviest volatile organic contamination is in the area between Madison Industries and Prickett's Pond. Contaminants which were detected include benzene (up to 230 ppb), chlorobenzene (up to 580 ppb), 1,1-dichloroethane (up to 640 ppb), 1,2-dichloroethane (up to 1200 ppb), trans-1,2-dichloroethylene (up to 1600 ppb), methylene chloride (up to 960 ppb), and toluene (up to 3000 ppb). In general, the concentrations of contaminants were lower compared to previous sampling episodes. The concentration of volatile organics detected beneath the CPS facility were also lower, less than 100 ppb.

SUMMARY OF REGULATORY/LEGAL ISSUES

Legal action was initiated against CPS Chemical and Madison Industries by NJDEP and the City of Perth Amboy. A 1978 court ruling required CPS to submit a plan for additional safeguards and containment at the facility; a soil-cement/asphalt containment base was constructed at the plant in 1979 after the plan was approved by NJDEP. In 1981, the Superior Court of New Jersey found CPS and Madison Industries responsible for pollution of the Runyon well field owned by the City of Perth Amboy, forcing the shut down of 32 suction wells and 3 pump wells in 1973 due to contamination with volatile organics and metals. CPS was determined to be the source of the organic chemical contamination, while Madison Industries was determined to be the source of the heavy metal contamination. The remedial action plan ordered by the court included the following items:

- Construction of a slurry cutoff wall (over 5,000 linear feet) keyed into an underlying clay layer around the 2 facilities to Prickett's Pond to contain the plume of ground water contamination.
- Installation of maintenance wells within the cutoff wall to maintain acceptable ground-water levels.

- Installation of decontamination wells for recovery and treatment of contaminated ground water not enclosed within the cutoff wall.
- Relocation of Prickett's Brook to the south of the 2 facilities.
- Dredging of contaminated sediments in Prickett's Pond.

In 1983, the Superior Court of New Jersey Appellate Division upheld the previous court decision and ordered the 2 facilities to finance the entire cost of the cleanup. The original court-ordered plan was determined to have feasibility problems due to geological evidence which indicated that the clay layer identified beneath the site, the South Amboy Fire Clay, is not continuous and therefore would not be an effective confining unit in which to key the proposed cutoff wall. An alternate cleanup plan developed by Wehran Engineering, a consultant for CPS, includes the following:

- Construction of a smaller crescent shaped slurry cutoff wall across the head of Prickett's Pond to contain the plume of contamination.
- Installation of pumping wells for removal and treatment of contaminated ground water.
- Relocation of Prickett's Brook to the south of the 2 facilities.

In general, the original plan ordered by the court calls for containment of the contamination, whereas the alternate plan provides for removal of the contamination and eventual restoration of the aquifer.

In 1983, the state grand jury found management personnel at the CPS facility responsible for illegal releases of wastes into the Old Bridge Township sewer on numerous occasions over the period 1978-1981. Substances released into the sewer included acetone, distillation heels, and flammable liquid waste from Tank 311. The state grand jury investigation also revealed that CPS employees were instructed to inject city water into monitoring wells at the facility on the nights preceding sampling of the wells.

SITE INSPECTION

A visual site inspection was conducted at the facility 5/8/87 by NJDEP/DHWM/Bureau of Planning and Assessment. Strong odors were evident throughout the plant during the inspection that were very acrid and metallic in nature, however it was difficult to determine whether the odors were coming from the CPS facility or Madison Industries. Ambient air and soil gas monitoring were conducted with an HNu Systems photoionization detector. No levels above background were detected in the ambient air around the plant during the inspection. In addition, the soil headspace was surveyed in the following areas:

- Unpaved ground area adjacent to the RCRA drum storage pad and Tank Farm 5
- Unpaved ground to the east of the bermed process area.
- Unpaved ground along the railroad siding.

No levels above background were detected in any of the above areas.

FINDINGS

1. Ground water beneath the facility is contaminated with volatile organic compounds including methylene chloride. Lead has also been detected in the ground water beneath the facility. A volatile organic plume has been identified in the ground water extending from the CPS facility toward Prickett's Pond, about 1000 feet southwest of the facility. The exact source of the contamination at the facility has not been clearly defined, although it is most likely due to miscellaneous spills and contaminated runoff from past operations.
2. Sediments in Prickett's Pond are contaminated with volatile organics including methylene chloride. The majority of the volatile organic contamination is confined to the eastern portion of the pond. Migration of contaminated ground water into the pond was determined to be the major mechanism accounting for the volatile organic contamination.
3. Soil samples were taken from 5 borings at the CPS facility in 1983. Low levels of volatile organic contamination were detected in 1 of the borings (B-2), in the area between the tank storage areas and Prickett's Brook.
4. The potential for soil and ground water contamination exists from past operations in the vicinity of the following solid waste management units: the 2 drum storage areas, the 5 tank storage areas, and the railroad transfer area. The potential for releases from these units is currently low due to the presence of adequate secondary containment.
5. The facility has a history of fugitive air emissions, mostly involving releases of acrylate odors. The facility has purchased a new scrubber for the acrylate and methyl acrylate process area, which should help correct fugitive air releases at the facility.
6. The facility has a history of bad management practices, including illegal releases of hazardous wastes into the sewer system and flushing of monitoring wells at the facility with city water. Substances released into the sewer on numerous occasions between 1978 and 1981 include acetone, distillation heels, and flammable liquid waste from Tank 311.
7. A 1981 court decision found CPS and Madison Industries responsible for pollution of the Runyon Watershed owned by the City of Perth Amboy, where public supply wells were shut down in 1973 due to contamination with volatile organics and metals. CPS was determined to be the source of the volatile organic contamination, while Madison Industries was determined to be the source of the heavy metal contamination.
8. Two remedial action plans have been proposed for the site: the court-ordered plan and an alternate plan developed by Wehran Engineering (consultant for CPS). The matter is currently in litigation to decide which plan will best remediate the contamination at the site.

SUMMARY OF RECOMMENDATIONS

The potential for soil and ground water contamination exists from past operations in the vicinity of the following solid waste management units:

- the 2 drum storage areas
- the 5 tank storage areas
- the railroad transfer area

Soil sampling should be conducted to determine if the underlying soil in the vicinity of the above units is contaminated. The process pad area should be upgraded to prevent any potential releases to soil and ground water. Existing on-site and off-site ground water monitoring wells should be sampled periodically to continue to monitor for ground water contamination. Two remedial plans have been developed to address the ground water contamination, and the matter is currently in litigation.